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EXPLORATORY TYPE OF EVALUATION OF TV TRAINING OF ELEMENTARY MATHEMATICS TEACHERS. FINAL REPORT.

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THE EFFECTIVENESS OF TELEVISION TEACHING OF ELEMENTARY MATHEMATICS TEACHERS WAS COMPARED WITH REGULAR CLASSROOM TEACHING BY ESTIMATING THE DIFFERENCES IN ACHIEVEMENT, INTEREST, DESIRE, MERIT, AND POSSIBILITIES THAT EACH APPROACH HAD TO OFFER. EACH GROUP WAS ADMINISTERED A BATTERY OF EIGHT TESTS ON A PRE- AND POST-TEST BASIS. ON EACH OF THE EIGHT TESTS THE REGULAR CLASS AVERAGED BETTER THAN THE TELEVISION CLASS, AND THE DIFFERENCE BETWEEN CLASSES TENDED TO INCREASE WITH TIME. IT WAS CONCLUDED THAT, WHILE THE TELEVISION CLASS PARTICIPANTS DID NOT ACHIEVE AS WELL AS THE REGULAR CLASS PARTICIPANTS, THE AVERAGE SCORES ON THE TESTS INDICATE THAT THE TELEVISION PARTICIPANTS DID GAIN CONSIDERABLE KNOWLEDGE FROM THE TELEVISED LESSONS. (GD)

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FINAL REPORT

Exploratory Type of Evaluation of TV Training of Elementary Mathematics Teachers.

Cooperative Research Project No. S-424-66

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Problem.

Television is a medium by which large numbers of persons in widely scattered regions can be educated. There is, however, some question about the effectiveness of education by television. The problem was to measure the effectiveness of TV training of elementary mathematics teachers.

Objectives.

This document is identified with Cooperative Research Project No. S-424-66. It is, however, intimately related to a series of 90 thirty-minute films developed by Southeastern State College at Durant, Oklahoma, in 1963 for the training of elementary teachers in modern mathematics. A grant from the National Science Foundation made the first 62 of the training films available over television in Central Oklahoma during the 1965-1966 school year. [See supporting papers Number 1 in Appendices.] The grant also provided for a classroom in-service program at Poteau, a town in extreme Eastern Oklahoma. [See supporting papers Number 2 in Appendices.]

In the light of the following facts, this seemed to be a natural setting for an economical study of an important question, "How effective is TV teaching?".

(1) The instructor for the series of films was Dr. Leslie A. Dwight, the same as the instructor for the in-service program at Poteau.

(2) The same text was used in both programs.

(3) Each week the lesson at Poteau covered the same material as that covered by the TV lecture.

(4) The films were already available.

(5) Financing of all related aspects of this study had already been assured.

Thus the project funded by the Small Contract Program made it possible to compare televised teaching with regular classroom teaching. Specifically, as stated in the project proposal, the objectives were:

(1) To estimate the difference in achievement between TV students and regular classroom students when the instructor was the same for both classes.

(2) To look for signs of the waning of interest in a nine-month TV training program.

(3) To determine, if possible, the desire among educators for programs involving TV training.

(4) To obtain a feeling for the merit of TV training as it relates to our national welfare.

(5) To obtain more information about the possibilities that exist in the medium of TV.

Related Literature.

TV training has, of course, been studied before but no project in the framework of the project undertaken here has, to our knowledge, been reported in the literature. The authors are aware of projects such as the one conducted at Pennsylvania State University in 1961 entitled "Achievement in Small Class, Large Class, and TV Instruction in College Mathematics." These projects were basically and inherently different in nature with findings and implications which differ, if not drastically, at least moderately from the results in the project being reported.

Procedures.

It was hoped that four different groups of participants should be studied.

(1) The first group was to consist of elementary teachers in the in-service mathematics program at Poteau, Oklahoma. This class developed with 28 who completed the course and was taught by Dr. Leslie A. Dwight. This group will be referred to as the REGULAR CLASS of participants.

(2) The second group was to consist of elementary teachers enrolled for credit at Oklahoma City University. This group materialized to the extent that five persons received credit under this program. However, these five participants only took the tests on the OCU campus. They did not participate in discussion sessions or receive academic help at OCU so they are classed with Group 4 described below.

(3) The third group, which did not materialize, was to have been a group of teachers who viewed the films weekly and with the encouragement of school administrators were to form local study groups. The grant was not approved until late in the summer of 1965. This was the primary reason the third group of participants did not materialize. Administrators who had stated earlier that they would encourage their teachers to participate in study groups failed to cooperate because:

a. Plans for in-service study programs had to be made earlier in the summer. Thus, plans for in-service study courses in other fields had already been scheduled.

b. Teachers would not be encouraged to participate in two in-service study programs.

(4) The fourth group, which began with 21 participants and eventually dwindled to a dozen participants, was to be composed of teachers who took periodic tests covering the material presented in the TV programs. These teachers had no sponsored study groups and received no credit. These twelve participants together with the five reported above in (2) will be referred to as the TV CLASS. Thus, there were 17 in the TV CLASS who completed the evaluation program.

For purposes of analysis, only two groups were actually studied. These were the REGULAR CLASS of 28 participants and the TV CLASS of 17 participants.

There were eight tests given with each participating teacher taking the same test at virtually the same time. The responses on these tests formed the primary basis for comparison. As part of the testing program, certain questions were asked before the material was presented on television or in the Poteau class. Later, after the material had been covered, the same questions were asked again. The totals of scores for the answers to the questions used in this way were called pre-test and post-test scores. Differences, averages, and totals of these scores were studied.

A personal record of participation was required for each participant and the college transcript for each was studied. The staff of the Audio-Visual Education Department at Southeastern State College collected the data, which was then analyzed by the authors of this report. [See Appendix Number 3 for directions sent to participants in the evaluation program.]

Analyses of the Data and Findings.

On each of the eight tests the REGULAR CLASS averaged better than the TV CLASS.

TABLE 1

Test Averages and Their Differences

TEST	I	II	III	IV	V	VI	VII	VIII
Regular	76.28	76.20	73.85	73.69	69.79	75.15	70.26	80.22
TV	72.75	66.56	70.00	66.93	64.50	65.31	57.94	64.44
Difference	3.53	9.64	3.85	6.76	5.29	9.84	12.32	15.78

Note that the difference between classes tends to increase with time. The overall average for the REGULAR CLASS was 74.38 while that of the TV CLASS was 66.02 with a difference if 8.36. Using a conventional student's test on the average test score for the 45 teachers involved, the difference 8.36 was concluded to be a highly significant difference.

Much effort was devoted to eliminating reasons for this significant difference. As a summary statement, we assert that in all respects studied the two groups had backgrounds which were similar. Some supporting evidence appears in the following table.

TABLE 2

Backgrounds of Participants

Average of Characteristic Studied	CLASS Regular	TV
Number of credits of mathematics in college	12.10	10.01
Years of experience teaching	11.79	13.18
Number of weeks of previous in-service or institute mathematics study	1.96	3.70
Age	39.86	43.47
Years since attending college	9.36	9.53
Grade average in college	2.78	2.83
Grade average in mathematics	2.55	2.47

Each of the characteristics appearing in the above table had a considerable amount of variability. As a result, the difference exhibited in the above table should not be considered significant. To illustrate and support the last statement, we give the range for each class and each characteristic in Table 3.

TABLE 3

Ranges for Characteristics Studied

Characteristics Studied	Ranges for Regular Class	TV Class
Number of credits of mathematics in college	0 to 41	0 to 42
Years of experience teaching	0 to 28	0 to 28
Number of weeks of previous in-service or institute mathematics study	0 to 36	0 to 18
Age	22 to 58	24 to 60
Years since attending college	0 to 26	0 to 36
Grade average in college	2.0 to 3.9	2.2 to 3.6
Grade average in mathematics	1.0 to 4.0	2.0 to 3.1

Of interest is the following table which shows that all the levels of teaching experience were represented in both groups and that the representation was approximately proportional to the group size.

TABLE 4

Teaching Level of Participants

Highest Grade Level of Teaching	NUMBER Regular	TV
1-3	6	4
4-6	11	7
7-8	6	2
9-12	4	2
None	1	2

In one respect the two groups differed greatly. The participants were asked to study the next lesson from a text written by the instructor and to record the number of hours spent in this endeavor. The regular class members recorded an average of 2.4 hours of study time per week while the TV group members recorded an average of 2.1 hours of study time per week.

Table 5 records in summary form the facts relative to the pre-test and post-test scores where the maximum possible score was 183.5.

TABLE 5

Pre and Post-Test Results

Average	CLASS Regular	TV
Pre-Test Score	72.6	72.3
Post-Test Score	126.1	109.8
Difference in Pre and Post-Test Scores	53.5	37.5
Percent of possible improvement realized	50%	35%

The percent of possible improvement realized was examined because it was felt that study of the differences alone might be unfair to the students who attained relatively high scores on their pre-test and thereby had less room for improvement. The percent of possible improvement, say P, was computed by the following formula:

$$P = \left(\frac{\text{Post-Test Score} - \text{Pre-Test Score}}{183.5 - \text{Pre-Test Score}}\right)100$$

The data agrees with that recorded elsewhere. The classes scored about the same on the pre-tests but the regular class at Poteau performed better on the post-test.

Conclusions and Implications.

(1) Evidence of waning of interest among TV participants.

There were 87 elementary teachers who said that they would participate in the TV evaluation program, but there were only 26 teachers who actually initiated the TV evaluation program. Of this group, only 17 completed the evaluation program as indicated in (4), page 4. It appears the lack of encouragement from administrators and the lack of interest on the part of elementary teachers and the waning of interest of those who did participate.

Also, there were 35 who enrolled in the REGULAR CLASS at Poteau, but only 28 of these completed the course.

Some insight into the relative waning of interest may be obtained by studying the differences exhibited in Table 1. As noted earlier, the difference between classes tends to increase with time, perhaps indicating that the TV waning of interest had the greater rate.

(2) For this study, it is evident the TV participants did not achieve as well as the regular class participants. Yet, the average scores on the tests indicate the TV participants did gain considerable knowledge from the televised lessons.

Again, we may assume that administrative encouragement and local organized study groups would have produced greater achievements among the TV class participants.

The large number of elementary teachers who may participate in a TV program and the achievement of the participants in this TV program provide evidence that TV teaching should receive careful consideration. TV teaching appears to have value in teaching basic concepts to large masses as in the present situation.

It is logical to assume the members of the REGULAR CLASS of participants received more encouragement to study the daily lessons than did the participants in the TV CLASS. Furthermore, it is assumed that the opportunities to ask questions by members of the regular class contributed to the difference of achievement.

(3) We do not believe this program was a fair test of the interest of educators in programs involving TV training. As stated earlier in this report, the project was begun after many schools had started the 1965-1966 school year. Thus, it was impractical for many administrators to promote the evaluation program in their systems.

(4) For the school year 1966-1967 the same set of films will be televised in three in-service programs: one in Missouri, one in Louisiana, and one in Tennessee. It is possible the same tests may be given in some of these programs. If so and if it

appears practical, we may compare these scores with those of the 1965-1966 participants. If this project is accomplished, an additional report will be made during the summer or fall of 1967.